COLONY OF SINGAPORE

ANNUAL REPORT OF THE BOTANIC GARDENS DEPARTMENT FOR 1954

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Mr. H. N. Ridley, C.M.G., F.R.S., Director of Singapore Botanic Gardens 1888–1912, on his ninety-ninth birthday—10th December, 1954

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ANNUAL REPORT OF THE BOTANIC GARDENS DEPARTMENT FOR 1954

BY

J. W. PURSEGLOVE
Director, Botanic Gardens
Singapore

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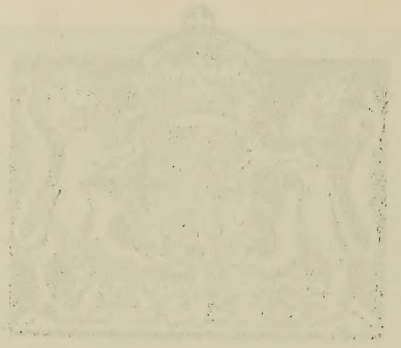

I. STAFF

MR. M. R. HENDERSON, Director of Botanic Gardens, 1949–54, who had been on the staff since 1924, went on leave prior to his retirement on the 6th June. Mr. J. W. Ewart, Curator, acted as Director from that date until the arrival of the new Director, Mr. J. W. Purseglove, on the 23rd August, on transfer from the Uganda Agricultural Department. Professor R. E. Holttum retired from the Chair of Botany at the University of Malaya and left the Colony in October. Dr. Holttum was appointed Assistant Director of Botanic Gardens in 1922 and was Director from 1925–49. The University conferred upon him the honorary degree of D.Sc. before his departure. He has retired to Kew where he will continue his taxonomic studies of Malayan plants. I am happy to record that Mr. H. N. Ridley, C.M.G., F.R.S., Director 1888–1912, celebrated his 99th birthday in his home at Kew on the 10th December, and that Mr. I. H. Burkill, Director 1912–25, now in his 85th year, is still actively engaged on botanical research. Thus, all four past Directors, beginning from 1888, are alive, which must be a record for any department in the Colonial Service.

2. Mr. H. M. Burkill, son of Mr. I. H. Burkill, was appointed Assistant Director and arrived in Singapore on the 14th December. With the appointment of an Agricultural Officer, Singapore, Mr. Ewart ceased to act part-time in that capacity and resumed full-time his post of Curator of Gardens. He proceeded on six weeks' annual leave on 4th December. Mr. G. H. Addison, Curator, Parks, was on vacation leave from 6th February until 14th September. Mr. J. Sinclair, Curator of the Herbarium, and Dr. C. X. Furtado, Assistant Botanist, were on duty throughout the year. Thus by the end of the year the Gardens had its full complement of senior staff for the first time since before the war. The list of the staff is given in Appendix *I*.

3. Mr. A. G. Alphonso, Horticultural Assistant, left Singapore on 27th August to attend a two years' course of training at the Royal Botanic Gardens, Kew.

4. The Director was Chairman of the Plant Protection Conference for South-East Asia and the Pacific Region convened by the Food and Agricultural Organisation of the United Nations and held at Singapore from 13th to 17th December. The Conference was attended by twenty-two delegates and observers representing ten Governments. A Draft Plant Protection Agreement for the region as a whole was drawn up, which, when ratified, should prevent the entry of destructive diseases and pests, and more especially the South American Leaf Blight of rubber (*Dothidella ulei*).

5. At the International Botanical Congress held in Paris in July, Mr. Purseglove was elected to the Committee of L'Association Internationale des Jardins Botaniques.

II. LABOUR

6. The average number of labourers employed per month in the Gardens was 81 and at Government House Domain 56. Health and attendance were good throughout the year. All labourers received increases in salary recommended by the Ritson Salaries Commission, which were retrospective from 16th June, 1953. The average daily salary of a daily-rated labourer or

gardener is now $3.20, plus an allowance of $1, a total of $4.20. Salary scales increased in the various grades of technical staff to a maximum of $7.75 per day for a mechanic, Grade II.

7. It is with regret that I record the death of Mr. Cheong Swee San, who served the Gardens faithfully for about thirty years, and who was for many years responsible for the display of potted plants. He collapsed at work on the 28th October and died about an hour later.

8. During the year five men from the Singapore Anti-Tuberculosis Association and the Rehabilitation Section of the Labour Department spent several months in the Gardens as gardener trainees.

III. METEOROLOGICAL

9. The total rainfall for the year of 117 inches was above the average of 104.35 inches for the last ten years. It was due largely to the phenomenal and almost continuous rain which fell in the second week of December. The total rainfall for December was 26.77 inches. This caused serious flooding in parts of Singapore, but did little serious damage in the Gardens. The highest shade temperature recorded during the year was 90° F. and the lowest 70° F.; the mean maximum temperature being 86° F. and the mean minimum 74.4° F. The average temperature at 9.30 a.m. was 80.5° F. and the mean relative humidity was 84.1 per cent. The meteorological records for the year are given in the Appendix *II*.

10. A freak storm with a series of small whirlwinds struck the Gardens on the afternoon of 12th April and did severe damage in several patches, but had no well-defined path. The general labourers spent the rest of April and the greater part of May in clearing away the debris.

IV. BUILDINGS AND ROADS

11. The redecorating of the offices and herbarium was begun towards the end of the year and has made a vast improvement. The herbarium is a two-storey building and the upper storey consisted of a gallery round the periphery. A floor has now been added thus making room for more herbarium cases. The fitting of glass-tiles in the roof eaves above the windows has dispersed the stygian gloom, so that electric lights are no longer necessary throughout the whole day. Work began on the new single-storey building behind the herbarium to house the spirit collection of plants, but which will be used temporarily to house the library. All the above work was done on contract from the Public Works Department and I am most grateful to that Department for their great help and co-operation in this matter, which has done so much to improve the appearance of the buildings.

12. Part of the south-end of the Plant House was reconstructed. The benches were demolished and replaced by beds retained by brick or coral walls. The old pipe-and-wire-netting arched pergolas were replaced by a flat-topped pergola on *tembusu* posts. A new orchid seedling house, 36 × 12 feet, was built on Lawn X. It was of a similar construction to the houses built in 1953 and consisted of a corrugated aluminium roof with Perspex lights on a wooden frame-work. A somewhat derelict plant house near the potting shed was demolished by a large *Alstonia scholaris*, which fell during

the storm of 12th April. It will be rebuilt in 1955. In December Lawns P and R were enclosed with a wire-mesh security fence with a double barbed-wire apron, prior to the transfer of the orchid collection from around the Director's house.

13. No work on roads, paths and drains was done by the Public Works Department during the year. Gardens' staff closed and turfed the paths on the Sun-dial and Pergola Terraces thus reducing the cost of maintenance and also improving the general appearance.

14. From the 1st May the Office Ring Road, the only road which is now generally open to vehicles, was restricted to one-way traffic with parking on the left of the road only. This has reduced traffic conjestion considerably, particularly at the weekends. Cyclists are still a nuisance and new by-laws to control them and other offenders are urgently wanted. No new by-laws have been made since 1922 and, although it is possible to prevent horses being grazed on the lawns, it is found impossible to control some other offenders.

V. LIBRARY

15. Towards the end of the year the Library, containing an extensive collection of botanical books, many of which are rare and valuable, was found to be heavily infested with boring beetles. Many of the books have since been hand-poisoned and all the shelves were removed from the office building where the clerical staff worked in one conjested corner. This has permitted re-organisation of the office, and a new building, built for the spirit collection, will be air-conditioned and used temporarily to house the library until such time as a new library can be built.

16. Many current periodicals are received in exchange for the *Gardens' Bulletin* and *Annual Reports,* and those for which subscriptions are paid were reviewed and amended. An effort is now being made not to duplicate unduly with the University of Malaya's Library, except for those journals which are in frequent use by both institutions. A few new books were added towards the end of the year. There are very considerable arrears of binding to be done.

17. Mr. G. A. C. Lopez, Library Assistant, resigned at the end of the year.

VI. BOTANICAL WORK AND HERBARIUM

(i) COLLECTING

18. Mr. Sinclair continued collecting in Singapore and accessible areas of Johore during the year. Despite the extensive collecting that has been done in Singapore over a period of many years, several new records were obtained, the most interesting being *Halorrhagis chinensis,* which from its situation is probably native, but had not previously been collected in Malaya. In an area of swamp forest in the water-catchment area, he found a tree fern, *Cyathea glabra,* and a waterlily, *Barclaya motleyi,* which had not been seen on the Island for many years.

19. By kind permission of the R.N.V.R. authorities, Mr. Sinclair made a short trip on the training ship *Panglima* to collect on Pulau Tinggi in May. He also made several visits to Sungei Tiram in Johore, but had to give them up when it became a centre of bandit activity. He again spent three weeks

collecting in Trengganu, this time in November, and collected 135 numbers, of which 60 were new records for Trengganu and 14 appear to be new species, which will be described later. I would like to thank the State Forest Officer, Mr. Fyfe, and the District Forest Officer, 'Che Ibrahim, who accompanied him and provided transport. Mr. Sinclair returned by way of Kota Bahru in Kelantan.

(ii) EXCHANGE OF HERBARIUM SPECIMENS

20. During the year 3,735 sheets of specimens were mounted and laid in the Herbarium, compared with the 1,636 in 1953. This increase was due in part to the 2,732 duplicates received from the Herbaria of Bogor, the Forest Departments of North Borneo, New Guinea and Sarawak, the Forest Research Institute at Kepong, Kew, Leiden, Dehra Dun and Manila. A large collection of fresh water swamp species gathered by Mr. J. A. R. Anderson of the Sarawak Forest Department was particularly valuable, as many of these were not represented in the Singapore Herbarium. Our grateful thanks are due to all those who donated specimens.

21. We sent out 3,321 exchange duplicates, compared with only 88 in 1953. These were despatched to the Herbaria of Kew, British Museum, Edinburgh, Leiden, Bogor, Paris, Manila, Dehra Dun, Forest Department of North Borneo, Forest Research Institute at Kepong, and Agricultural Department at Bangkok.

22. There was also an increase in the number of specimens sent on loan to botanists working on the *Flora Malesiana*, mainly to Leiden, Bogor and Kew, the number being 3,097 as compared with 2,563 in 1953. A number of previous loans were returned with the plant names checked and revised and many unnamed specimens were determined. This will be of great assistance to future botanists studying our collections, as the names in these families have now been brought up-to-date.

(iii) TAXONOMIC RESEARCH

23. Mr. Sinclair, when not engaged on routine work of identification, etc., continued his revision of Myristicaceæ (Nutmeg Family). He obtained loans of specimens from Kew, Calcutta, Dehra Dun, Lae, Leiden, Utrecht, Florence and Breslau, which helped him to clear up various points of the nomenclature. Unfortunately many of the types of the New Guinea species were destroyed in Berlin during the war, thus adding to the difficulty of the work.

24. Dr. Furtado continued his investigation of palms, revising the genus *Calamus*. It is a particularly difficult genus, as specimens preserved in herbaria are often imperfect, due to the difficulty of collecting large rattans which climb to the top of tall trees and are firmly fixed by reflexed hooks. Often only the tips of the leaves are collected and the more difficult basal parts and troublesome spiny sheaths are neglected. Furthermore, the parts required for exact identification are many, and unless all portions are carefully labelled at the time of collection there is a danger of mixing them during drying. In fact one rattan specimen sent to Singapore was found on examination to consist of three distinct genera.

(iv) WEEKLY EXHIBIT OF WILD FLOWERS

25. Beginning in November a small weekly exhibit of seven common wild plants, which can be found growing in Singapore, was staged in the Plant House. Wherever possible the previous week's exhibit was maintained

J. W. Purseglove

Dendrobium Hybrids growing in hanging pots under light shade

J. W. Purseglove

Tacca cristata Jack, an indigenous Malayan plant

G. H. Addison

Vandanthe rothschildiana, a variety of which was awarded F.C.C. at the R.H.S. Chelsea Flower Show, 1954

G. H. Addison

Dendrobium John Nauen, a hybrid of *D. formosa* and *D. takahashii* named after the late Mr. Nauen, Curator of Gardens, 1935–42

for reference. By this means it is hoped that the general public, more especially teachers and students, will take a more lively interest in the plants which grow around them. The exhibit has proved very popular, and is visited by large numbers of people. The plants are labelled with their scientific, English and Malay names, the family and brief notes are given on each plant.

VII. HORTICULTURAL WORK

(i) GENERAL

26. Routine planting, as well as the general maintenance of the Gardens, was carried out during the year, and a few of these many operations are mentioned: Following the turfing of the paths of the Sun-dial Terrace, borders were made along the outer edge and planted with standard Hibiscus and Gerberas. A bed of *Euphorbia pulcherrima* (Poinsettia) was particularly successful; good drainage provided by 2 feet of rubble in the bottom of the bed and a 4-inch drainage pipe being largely responsible, together with a monthly application of sulphate of ammonia at the rate of 2 oz. per square yard. The latter undoubtedly intensifies the red colour of the bracts. On the poor, heavy clay soils in the Gardens, good drainage and adequate feeding are essential for the successful growth and flowering of most introduced species of trees, shrubs and herbs. Regular supplies of cattle manure from the Animal Quarantine Station and spent-hops from the Malayan Breweries were obtained during the year. Large quantities of compost were made in the Gardens, while Sterameal has proved valuable as a general-purpose, organic fertilizer. Some clearing and replanting was done in the Dell and unwanted tree seedlings removed from the Arboretum. The thicket between the Director's house and Tyersall Avenue, which had encroached considerably on Lawn T, was cut back towards the end of the year and several years' accumulation of rubbish was removed. One man was employed full time throughout the year removing weeds from the lake.

(ii) ORCHIDS

27. The outstanding event of the year in orchid circles was the success of Singapore-grown orchids at the Chelsea Flower Show of the Royal Horticultural Society in May, where they were exhibited by Mrs. Gracia Lewis. The exhibit as a whole was awarded the Lindley Medal and two of the hybrids received the highest awards of the Royal Horticultural Society for individual flowers, namely First Class Certificates. This was an outstanding achievement, as only three First Class Certificates were awarded in the entire show. The third went to a carnation. The Singapore orchids receiving the awards were Vanda Tan Chay Yan, raised in the Botanic Gardens from a cross made by Mr. Tan Hoon Siang, and *Vandanthe rothschildiana*, from Mr. D. C. Doo's collection in Singapore. The latter orchid was particularly admired by the Queen Mother. Vanda Tan Chay Yan, which is illustrated between pages 6 and 7, has fulfilled its early promise and is considered one of the best *Vanda* hybrids produced anywhere in the world. Our seedlings of this hybrid flower almost continuously producing a succession of fine inflorescences. We are now using it extensively for further crossing and have crossed it with *Vandanthe rothschildiana* and other good hybrids such as V. Ellen Noa, *V. tatzeri* and *Vanda hertziana*, and now have seedlings of these crosses in the flask stage.

28. During the year a few new hybrids flowered for the first time. They were Aranda Abdul Kadir (Vanda Kapoho x Arachnis Ishbel), Cypripedium Pygmy (*C. concolor* x *C. barbatum*), Dendrobium Max Lewis (D. Bali x D. Louis Bleriot), D. Bali (selfed), D. Ng Tar Kuay (D. Medusa x D. Curlylocks), *Vanda dearei* x *V. merrillii*, *V. dearei* x V. Kapoho, Vandachnis Premier (*Arachnis flos-aeris* x *Vandopsis lissochiloides*).

29. The number of orchid seedlings increased considerably and the four orchid seedling houses, of which one was built during the year, with aluminium and Perspex roofing and open sides, have proved very effective and the young plants have shown excellent growth. Further houses are now required to house the ever-increasing number of seedlings. During the year 144 crosses were made and there were over 1,500 flasks of seedlings in the laboratory, with over 50 seedlings per flask. As stated in last year's report, flasks plugged with cotton wool disinfected with mercuric chloride and picric acid gave a poor germination and caused yellowing of the seedlings. These disinfectants have now been replaced with copper sulphate, which shows no harmful effects. The use of Vacin's formula in the flasks, which is a mixture of inorganic salts and sugar in *agar-agar* was continued. The use of urine and extract of decomposed fish was discontinued, as the odour was somewhat obnoxious to the laboratory staff. Mr. J. L. Pestana carried out an experiment using Sterameal, fish manure and inorganic manures on seedlings which had been potted up and placed in the seedling house. It was found that the organic manures resulted in the growth of a thick mat of algae on the benches and the bottoms of the pots, which eventually blocked the drainage holes, thus causing water-logging and the eventual death of the young plants. This was overcome by placing the pots in sand to facilitate drainage.

(iii) SUCCULENTS

30. The succulent collection was added to during the year by the exchange of seeds with other institutions and we now have over 300 species in cultivation. There is an increasing interest by the general public in growing succulents locally and it was found impossible to meet all the demands for the purchase of these plants.

(iv) PLANT EXCHANGE AND SALES

31. The Gardens continued to sell plants to the general public and there was a considerable increase in the number sold, namely 24,057 compared with 15,117 in 1953. In addition 2,740 orchid plants and seedlings were sold. Numerous requests were received from overseas and these were met as far as possible. It is the policy of the Gardens to grow for sale only those trees, shrubs and herbaceous plants which cannot be obtained from the local nurseries. In providing this service, undoubtedly the standard of local horticulture is raised and the variety of plants grown in local gardens is extended. The total revenue from the sale of plants was $19,416, an increase of $1,888 over the 1953 sales. Of the total figure, $11,920 came from the sale of orchids. We supplied 9,690 plants free to schools and other government institutions.

32. In addition to the sales, it has been the custom of the Gardens to exchange seeds and plants with other botanical institutions. The requests for such exchanges is increasing. 179 plants and 878 packets of seeds were sent out, while we received 154 plants and 489 packets of seeds. This disparity in numbers is not surprising, as the number of institutions which can supply

The pictures on this page are of tropical hybrid orchids grown in Singapore. It is common for amateurs to effect their own crosses and in many cases to hand over the seeds they produce to the Botanic Gardens for germination.

The top picture is of *Vanda Tan Chay Yan* (*Vanda Josephine van Brero* × *Vanda dearei*) which was awarded a First Class Certificate at he Royal Horticultural Society's show at Chelsea in 1951.

The middle picture shows *Vanda Prolific* (*Vanda Nam Kee* × *Vanda Singapore*), a very free flowering hybrid. It first flowered in September in 1949, two and a half years after the seed was sown—four years is an average for Singapore hybrids.

G. H. Addison

The bottom picture is of *Vanda Kapoho* (*Vanda lamellata* var *boxallii* × *Vanda tricolor*) raised simultaneously in Singapore and Hawaii. It is a free flowering hybrid with an attractive scent. Orchids have been raised in Singapore since 1928 and are a regular feature of the Singapore Annual Flower Show.

plants which will grow in Singapore is limited, whereas Botanic Gardens in temperate regions can grow tropical plants in their glass-houses and the number of tropical Botanic Gardens is small. Furthermore, we have always had a high reputation for sending out seeds in good condition and well packed. This friendly exchange is valuable and helps to maintain contact with a great number of Botanic Gardens and institutions throughout the world, who help us in many ways.

33. A further service provided by the Gardens is the loaning of potted foliage plants for Government and certain charity functions in Singapore, and during the year 4,201 plants were loaned for this purpose.

VIII. GOVERNMENT HOUSE DOMAIN

34. The grounds of the Domain were kept in good condition except for a period in the middle of the year when most of the mowers were out of order at one time. The Allen motor scythes were found invaluable in keeping down the rough grass in the outlying parts of the Domain.

35. The major improvement during the year was the reconstruction of the Court Garden at Government House. The tree screen was removed and replaced by a *Cordia* hedge, thus permitting the entry of more light and air. The pathways were redesigned and laid with crazy paving by the Public Works Department, while new beds were planned and planted with Cannas, *Pentas, Galphimia, Crossandra, Bouganvillia poultoni* and *Calliandra surinamensis*.

36. The triangular section on the left of the road leading to the office was also replanned. Three tall trees and some ancient Hibiscus standards were removed. A new border was planted with fairly tall shrubs such as *Stenolobium stans* and *Jatropha pandurifolia*, interspersed with *Lantana* and *Crossandra*, which should be very colourful.

37. The very large *Lagerstræmia* on the top of the slope above the Guard Room in Government House grounds, which became poor and very unsightly, was pruned severely and cut back to a height of 12 feet, and has since made an excellent recovery. The two pergolas of *Mucuna bennettii* (New Guinea Creeper) have grown well and it is of interest to record that the younger plant which has never been pruned flowered very well, while the plant which was pruned in 1953 has not flowered since that date. The *Stenolobium stans* on either side of the main drive flowered six times during the year. With the application of Sterameal, it has been found that the Cannas may be planted once a year instead of twice as formerly. The fine *Araucaria cunninghamiana* in the Colonial Secretary's garden fell during a high wind and was found to be badly damaged by white ants, a common failing with this species. Frequent applications of organic manures, such as compost made from spent-hops and garden refuse, and also with cattle and horse manure, is essential for good growth and flowering in the Domain.

38. About 2,500 pot plants have to be maintained in order to supply the houses of the Domain twice weekly. Burnt earth is made once per month for potting. The heavy rains in December did much damage to the plants, particularly the younger seedlings in the potting yard. Vegetables and orchids were supplied regularly from the nursery.

39. Plants from the Domain were again entered in the Singapore Flower Show.

IX. ADVISORY WORK

40. The Curators, as is customary, advised various Government Departments on the layout of grounds, road-verges, etc., and the Gardens provided planting material in many cases. Many other institutions, firms and people also asked for advice; their requests were dealt with in the office or, if circumstances warranted it, visits were made. The major new tree planting scheme was on the new Changi Coast Road and the Tanah Merah Besar Road. The latter was planted with *Gardenia carinata* and *Lagerstræmia flos-reginæ*. Some 150 shrubs and trees were provided for the new turnabouts on the Bukit Timah Road. The usual contact was maintained with the City Council Parks Department, and planting material was exchanged.

41. The Department supervised the transplanting of a *Ficus religiosa* from the main runway of the new International Airport at Paya Lebar. This holy tree, which had a shrine at its base, is said to have been brought as a cutting from a tree in Ceylon, which in turn was a scion of the tree at Magadha under which Buddha became incarnate. The tree at Paya Lebar was over 70 feet high and was cut back to about 30 feet. The tree with a ball of earth, weighing altogether about 25 tons, was transported to a site half a mile away and replanted. It seems probable that the tree will establish itself satisfactorily on the new site.

X. NATURE RESERVES

42. Prior to 1936 most of the present Nature Reserves were Forest Reserves under the old Forest Ordinance, but in that year it was decided that they were no longer worth maintaining for production. In July 1937, the Botanic Gardens took over the maintenance of certain reserves, namely, Bukit Timah, Pandan and Kranji and in 1938 the Director of the Botanic Gardens was gazetted Conservator of Forests, a post which had originally been held by Mr. Ridley. In 1951 the Nature Reserves Ordinance was enacted and the Board of Management of one *ex-officio* and six nominated trustees was formed to administer the Reserves. The Director of Gardens is the *ex-officio* Chairman of the Board. At this time the Municipal Catchment Area and the cliff-face at Labrador (Pasir Panjang Reserve) were added, making a total of over 9,000 acres of Nature Reserves in the Colony, which are thus "dedicated, set aside and reserved for the purpose of the propagation, protection and preservation of the indigenous fauna and flora of the Colony and for the preservation of objects and places of æsthetic, historical or scientific interest".

43. Bukit Timah was one of the first Forest Reserves made in Singapore, shortly after Cantley's Report of 1883, and is one of the few remaining areas of good primary rain forest left on the Island. It has been a botanical collecting-ground for more than a century and from it has been obtained the first known specimens of many species of Malayan plants. Apart from the quarries which disfigure the lower slopes and which are outside the boundary of the reserve, Bukit Timah has been little altered since the earliest days and has been little exploited for timber. At present it is just big enough to maintain its own internal climate and to be self-maintaining in regard to plant species. Any further opening up of the area would be disastrous. The other Nature Reserves contain areas of fresh-water and mangrove-swamp forests, while much of the catchment area is secondary forest and scrub (*belukar*).

44. In the Bukit Timah and Kranji Reserves, where staff has been employed for many years, the reserves have remained inviolate. In other reserves where staff is not available, some clandestine cutting goes on. Prior to 1954 there had been only one meeting of the trustees, but during the year meetings were held on the 26th February and 15th November. It is now proposed that meetings should be held quarterly.

XI. SINGAPORE GARDENING SOCIETY

45. The Department was largely responsible for the formation of the Singapore Gardening Society in 1936, and Professor Holttum was President for many years. Mr. Ewart, the Curator of Gardens, is President for the year 1954/55. Meetings are held monthly, often in the Botanic Gardens, where demonstrations of practical horticulture are given. The Society has 238 members and is flourishing. The average attendance at meetings was 64. It staged its sixth post-war Flower Show on 2nd–4th April, which was held at the Happy World Stadium. It was most successful, with 536 entries, and a high standard of exhibits was maintained. Mr. Ewart was show-manager and Mr. Alphonso was assistant manager. A large non-competitive group of orchids was exhibited by the Gardens, while tulips, hyacinths and lilacs from Holland and orchids from England were displayed in a cool house erected for the purpose.

XII. VISITORS

46. Professor Dr. C. G. G. J. van Steenis, General Editor of the *Flora Malesiana,* visited the Gardens in January and was accompanied by Mr. Henderson on a tour of some of the interesting botanical areas in the Federation of Malaya. Other notable visitors included Sir Roland Robinson, M.P., all the delegates and observers attending the F.A.O. Plant Protection Conference held in Singapore in December, and Mr. C. V. Jacks, Director of the Commonwealth Bureau of Soil Science.

XIII. PUBLICATIONS

47. The sixth small volume in the series *Malayan Garden Plants* was published during the year, while volume II was reprinted. The *Gardens' Bulletin,* Vol. XIV, Part 2, was handed in for publication early in the year, but did not come out until February 1955. Messrs. Addison and Henderson continued their work on the illustrated book of *Malayan Orchid Hybrids,* which it is hoped will be published in 1955.

48. The articles and other works that were published during the year were as follows:—

ADDISON, G. H.; HENDERSON, M. R.—New Hybrids from Singapore. *Orchid Journal III,* 4, 1954.

HENDERSON, M. R.—*Malayan Wild Flowers—Monocotyledons.* Malayan Nature Society, Kuala Lumpur.

HENDERSON, M. R.—*Malayan Garden Plants, Vol. VI—Ten Herbaceous Plants*—Government Printer, Singapore.

APPENDIX I

STAFF OF BOTANIC GARDENS, 1954

DIVISIONS I–III

Appointment	*Name*	*Remarks*
Director	M. R. Henderson, F.L.S. ...	1-1-54–6-6-54
	J. W. Purseglove, B.SC., A.I.C.T.A., F.L.S.	From 23-8-54
Assistant Director ...	H. M. Burkill, M.A., F.L.S. ...	From 14-12-54
Curator of Herbarium ...	J. Sinclair, B.SC.	
Assistant Botanist ...	C. X. Furtado, D.SC.	
Curators (2) ...	J. W. Ewart	Acting Director 7-6-54–22-8-54
	G. H. Addison	On leave 6-2-54–14-9-54
Laboratory Assistant (Special Grade) ...	J. L. Pestana	
Horticultural Assistant ...	A. G. Alphonso	Proceeded for training in U.K. 23-8-54
Herbarium and Museum Assistant ...	Haji Mohd. Nur bin Mohd. Ghous	
Laboratory Assistant ...	Bajuri bin Sappan	
Artist	Juraimi bin Samsuri	
Clerks	Abdul Wahab bin Abdul Hamid ...	Until 21-9-54
	Loh Fon Sen	From 20-9-54
	K. Veerappan	
	Miss Celine Schelkis	
Despatch Clerk ...	R. Raphael	
Stenographer ...	Miss Diana Foo	From 5-11-54
Library Assistant ...	G. A. C. Lopez	
Junior Horticultural Assistant	Abdul Aziz bin Pakiri	
Junior Horticultural Assistant (Govt. House Domain)	Wong Siew Hang	
Storekeeper ...	Ismail bin Ahmad	

APPENDIX II

METEOROLOGICAL RECORDS

BOTANIC GARDENS, SINGAPORE 1954

Readings Daily at 2.00 hrs. G.M.T.=9.30 a.m. Local Time

Month	Mean Temp. at 9.30 a.m.	Highest Max. Temp.	Lowest Min. Temp.	Mean Max. Temp.	Mean Min. Temp.	Mean Rel. Humidity	Rainfall	Average 1944–54	Highest Rainfall in 24 hrs.	Number of days
	°F	°F	°F	°F	°F	per cent	in.	in.	in.	
January	79.5	89.0	72.0	83.9	73.9	86.0	7.62	9.43	1.10	21
February	80.6	91.0	72.0	86.9	74.0	82.1	9.40	8.85	3.68	19
March	80.9	92.0	72.5	87.1	74.4	82.0	5.81	9.72	1.75	14
April	82.4	92.5	73.5	85.8	75.5	82.8	6.89	9.94	1.28	22
May	82.1	93.0	72.5	88.2	75.7	84.7	5.41	7.40	1.31	13
June	80.6	92.0	71.0	86.6	74.9	85.1	13.04	6.52	4.35	17
July	80.3	90.5	72.5	85.5	74.6	85.0	7.49	6.69	1.97	19
August	80.5	90.0	71.5	86.4	74.8	84.9	8.87	6.93	2.10	19
September	80.9	90.0	72.5	85.9	75.1	82.3	5.64	7.95	1.80	18
October	79.9	89.0	70.0	85.7	73.7	84.8	10.75	8.25	3.00	24
November	79.9	92.0	71.5	86.4	73.8	83.7	9.31	10.49	1.82	25
December	78.9	89.0	71.5	84.1	73.1	85.7	26.77	12.18	5.65	24
Total or Mean ..	80.5	93.0	70.0	86.0	74.4	84.1	117.00	104.35	5.65	235

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